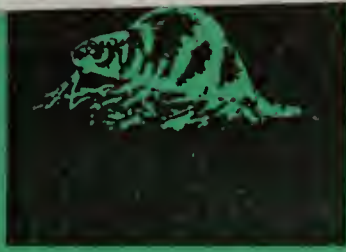


TERRY N* LONNER
R-3 HEADQUARTERS
BOZEMAN MT



STATEWIDE FURBEARER PROGRAM

ANNUAL
MANAGEMENT
& HARVEST REPORT

1993-1994

MONTANA



*Montana Fish,
Wildlife & Parks*



Montana State Library



3 0864 1006 9542 1

**STATEWIDE
FURBEARER PROGRAM**

1993-94 ANNUAL
MANAGEMENT AND HARVEST REPORT

PERIOD COVERED: July 1, 1993 - June 30, 1994

PREPARED BY: Brian Giddings
Statewide Furbearer Coordinator
Department of Fish, Wildlife & Parks
P.O. Box 200701
Helena, MT 59620-0701

DATE: August 15, 1995

TABLE OF CONTENTS

List of Tables	ii
List of Figures	iii
Program Goals	1
Statewide Objectives	1
Management Strategies	1
Management and Harvest Activities	2
Statewide Management and Harvest Results	4
Trapping District (Ecoregion) Management and Harvest Results	27
Trapping District 1 (NW Montane)	27
Trapping District 2 (NW Montane)	29
Trapping District 3 (SW Montane)	31
Trapping District 4 (Glaciated Plains and Mountains)	33
Trapping District 5 (Unglaciated Plains and Mountains)	34
Trapping District 6 (Glaciated Eastern Plains)	35
Trapping District 7 (Unglaciated Eastern Plains)	36
Literature Cited	37
Appendix	38

LIST OF TABLES

Table

1	Statewide summary of winter track survey results for selected species (NW & SW Montane ecoregions)	7
2	Statewide indices of track detection rates (detections/100 miles) for selected species (NW & SW Montane ecoregions)	7
3	Statewide summary of trapper and houndsmen logbook reports for selected species (and # of counties)	8
4	Statewide summary of FWP furbearer occurrence/distribution reports for selected species (and # of counties)	8
5	Montana trapping and hunting license sales, 1993-94	9
6	Montana furbearer, predator and nongame species harvest summary, 1993-94	9
7	Montana furbearer, predator and nongame species 10-year harvest summary, 1984-85 to 1993-94	10
8	Estimated average Montana pelt values, by species	11
9	Summary of winter track survey results for selected species, Trapping District 1 (NW Montane ecoregion)	28
10	Indices of track detection rates (detections/100 miles) for selected species, Trapping District 1 (NW Montane ecoregion)	28
11	Summary of winter track survey results for selected species, Trapping District 2 (NW Montane ecoregion)	30
12	Indices of track detection rates (detections/100 miles) for selected species, Trapping District 2 (NW Montane ecoregion)	30
13	Summary of winter track survey results for selected species, Trapping District 3 (SW Montane ecoregion)	32
14	Indices of track detection rates (detections/100 miles) for selected species, Trapping District 3 (SW Montane ecoregion)	32

LIST OF FIGURES

Figure

1	State map delineating trapping districts (or ecoregions), counties, and ecosystems in Montana	4
2	Statewide beaver harvest by trapping district (and ecoregion), 1984-85 to 1993-94	12
3	Statewide otter harvest by trapping district (and ecoregion), 1984-85 to 1993-94	13
4	Statewide muskrat harvest by trapping district (and ecoregion), 1984-85 to 1993-94	14
5	Statewide mink harvest by trapping district (and ecoregion), 1984-85 to 1993-94	15
6	Statewide marten harvest by trapping district (and ecoregion), 1984-85 to 1993-94	16
7	Statewide fisher harvest by trapping district (and ecoregion), 1984-85 to 1993-94	17
8	Statewide wolverine harvest by trapping district (and ecoregion), 1984-85 to 1993-94	18
9	Statewide lynx harvest by trapping district (and ecoregion), 1984-85 to 1993-94	19
10	Statewide bobcat harvest by trapping district (and ecoregion), 1984-85 to 1993-94	20
11	Statewide weasel harvest by trapping district (and ecoregion), 1984-85 to 1993-94	21
12	Statewide skunk harvest by trapping district (and ecoregion), 1984-85 to 1993-94	22
13	Statewide coyote harvest by trapping district (and ecoregion), 1984-85 to 1993-94	23
14	Statewide fox harvest by trapping district (and ecoregion), 1984-85 to 1993-94	24
15	Statewide raccoon harvest by trapping district (and ecoregion), 1984-85 to 1993-94	25
16	Statewide badger harvest by trapping district (and ecoregion), 1984-85 to 1993-94	26

Program Goals:

- 1) To provide ecological, recreational, cultural, educational, economic, and scientific benefits of the state's furbearers through sound resource management.
- 2) To address the social impacts of furbearers on human health, private property, and agricultural values.

Statewide Objectives

- 1) Monitor population status and the distribution of each furbearer species.
- 2) Maintain the state's viable population of each species through the conservation and enhancement of furbearer habitats.
- 3) Provide the various publics with the opportunity for consumptive and nonconsumptive uses of the furbearer resource.
- 4) Optimize recreational harvest opportunities through a sustained use management approach.
- 5) Minimize animal damage and/or nuisance wildlife problems utilizing Department policies and management practices.
- 6) Promote trapping practices that minimize the take of non-target species and the inhumane harvest of furbearers.
- 7) Develop a public understanding and acceptance of the basis for the consumptive use of furbearers.

Management Strategies

- 1) Identify and associate species distribution and population trends with delineated habitat base or ecoregion.
- 2) Monitor species status through population/habitat surveys, occurrence reports, and harvest data, and research information.
- 3) Utilize regulatory mechanisms to provide trapper/hunter participation, harvest data and biological information.

Management and Harvest Activities

- 1) Population information and harvest data were collected and reported by state, trapping district (or ecoregion), and county. This method is intended to more closely describe the association between species diversity, distribution and abundance with identified ecosystems and to use reconcilable legal units in Montana.

Seven legally defined trapping districts correspond on a broad scale with six described ecoregions in the state (Lemke 1993). Trapping Districts 1 and 2 are associated with the NW Montane ecoregion, Trapping District 3 with the SW Montane ecoregion, Trapping District 4 with the Glaciated Plains and Mountains ecoregion, Trapping District 5 with the Non-glaciated Plains and Mountains ecoregion, Trapping District 6 with the Glaciated Eastern Plains ecoregion, and Trapping District 7 with the Non-glaciated Eastern Plains ecoregion.

- 2) Annual winter furbearer snow track surveys were conducted by biologists following standardized survey protocol and track identification methods (Zielinski and Kucera 1994, Halfpenny 1994) in Trapping Districts 1-3 (NW and SW Montane ecoregions). The number of track detections were recorded along selected routes for furbearers which include marten, fisher, wolverine, lynx, and bobcat; prey species such as snowshoe hares and pine squirrels; and lion, weasel and coyote. Standardized forms were used to record species track detections (Appendix A) and track identification measurements (Appendix B).

Surveys are utilized to determine 1) species occurrence, 2) trends in annual track detection rates, and 3) relative abundance. A prey indices of snowshoe hare numbers is used to predict furbearer population fluctuations and annual recruitment. This is a continuing activity to further develop route design, detection methods, and to investigate population estimation techniques.

- 3) Biologists in Trapping Districts 4, 5, 6, and 7 (Glaciated/ Non-glaciated Plains and Mountains and Glaciated/Non-glaciated Eastern Plains ecoregions) are in the process of developing lagomorph prey indices through the use of headlight surveys. The number of lagomorphs are counted on established routes three times each year. This index to prey availability is utilized to predict bobcat population fluctuations by anticipating changes in annual production (March surveys) or recruitment levels (September surveys).
- 4) Trapper and houndman logbooks (Appendix C) are distributed statewide to individual cooperators, compiled, and data recorded annually. Logbook information contributes additional species population occurrence data to delineate statewide and trapping district (or ecoregion) distribution of selected furbearer species (fisher, wolverine, lynx, otter, and swift fox).

- 5) Department furbearer occurrence/distribution reports (Appendix D) are distributed and collected annually. Reports are completed only by Department personnel from verified reports or personal observations. Accumulated reports provide species occurrence data to delineate statewide and trapping district (or ecoregion) distribution of selected furbearer species (fisher, wolverine, lynx, otter, and swift fox).
- 6) The annual harvest of marten, fisher, wolverine, lynx, bobcat, otter, and a portion of the beaver harvest was monitored through a statewide pelt tagging and harvest registration system. All tag sealing and written registration is conducted by Fish, Wildlife and Parks personnel. Marten, fisher, wolverine and beaver pelts are tagged under authority of the state while otter, lynx and bobcat are tagged under mandate of the U.S. Fish and Wildlife Service to meet federal CITES export requirements. A harvest data form indicating the specific information which is recorded is presented in Appendix E.
- 7) Harvest data on two other furbearers and six fur producing mammals (muskrat, mink, weasel, skunk, coyote, fox, raccoon, badger) was collected through a trapping and furbearer harvest survey questionnaire. Beginning in the 1993-94 report period, the same harvest data was collected on the seven registered furbearers through the survey questionnaire, specifically to provide trapper effort and catch rates. These variables will be used in developing a long-term species population trend indices.

The trapping and fur harvest survey was mailed to all resident and nonresident license holders. Questionnaires were returned from 692 (37%) of the 1,884 people who purchased a trapper's license during the 1993-94 trapping season. No reminder was sent to nonrespondents. Expanded estimates of furbearer trapping, hunting, and harvest activities were made from the returned sample. The survey requested information on the estimated number of species harvested by county and trapping district, harvest method, and harvest effort (Appendix F). Summary harvest statistics and calculated catch rates were generated by a software package at the FWP Research Bureau.

- 8) Mandatory carcass collections were required for fisher and wolverine during the 1993-94 trapping/hunting season. Bobcat skulls were required to be surrendered in Trapping Districts 2 and 3 while marten skulls were requested to be turned in on a voluntary basis statewide. All carcasses and skulls are forwarded to the Department's wildlife research laboratory for biological analysis to determine each specimens age, sex, body condition, food habits, reproductive history, and collect tissue samples.
- 9) A fur dealer survey was conducted by the statewide furbearer coordinator by contacting the primary fur dealers in Montana in order to obtain average pelt values for each fur-producing species. This information is used to calculate economic fur values of the annual harvest.

- 10) Furbearer research is an ongoing statewide activity which is utilized to address management related issues on a species specific basis. Although no field research was conducted during the report period, several state university research projects and an independent research report were published during 1993-94.

Statewide Management and Harvest Results

Management and harvest results are recorded, analyzed and reported by state, trapping district (or ecoregion) and county. These units are delineated in Figure 1.

The statewide results from the annual snow track surveys conducted in Trapping Districts 1, 2 and 3 (NW & SW Montane ecoregions) which were initiated in 1990-91, through the 1993-94 report period, are presented in Table 1. Numbers reported indicate total track detections recorded of prey species, selected furbearers and several predators along combined routes. The corresponding indices of track detection rates per 100 miles traveled are provided in Table 2.

Long-term trends in species detection rates may indicate changes in relative species abundance. Combined statewide results (NW and SW Montane ecoregions) from these three Trapping Districts indicate track detection rates decreased 37% for snowshoe hare from the previous year and 55% from 1991-92. There was also a decline in marten and bobcat detection rates, by 26% and 17% respectively, from the previous year. However, detection rates for fisher and wolverine increased slightly while the detection rate for lynx increased 60% from 1992-93.

Statewide results (NW and SW Montane ecoregions) of furbearer occurrence data from trapper and houndsmen logbooks and the FWP occurrence/distribution reports are shown in Tables 3 and 4, respectively. These tables reflect the total number of logbooks or reports received on selected species, the number of occurrences by species, and the number of counties where reports took place. The number of logbook reports increased for fisher, but decreased for wolverine and lynx from the 1991-92 to 1992-93 period while the number of counties reported increased for all three species. The number of FWP occurrence/distribution reports showed a dramatic increase over previous years with a corresponding rise in reports for fisher and lynx. The number of counties reported increased for wolverine and lynx.

Statewide trapping and hunting license sales declined by about 1% from 1992-93, to 1,884 licenses sold during 1993-94 (Table 5). Point of sale results were mixed, with increased sales among five regional offices from the previous year (1, 2, 4, 5, 6) and decreases at two regional offices (3, 7) and the state headquarters (Helena). However, a general upward trend in statewide license sales is apparently continuing from a recent low of 1,736 licenses sold in 1990-91.

Montana's furbearer, predator and nongame species harvest for the 1993-94 season is presented in Table 6. These figures represent the known legal harvest of registered species and an estimated harvest of the remaining species. Detailed harvest statistic estimates by species, trapping district and county are available in the Annual Trapping and Fur Harvest Report (Haskins et al. (1994). Harvest statistics, which were calculated from the revised statewide

trapper survey, now report trapper effort (trap days/trappers) and calculated catch rates (trap days/catch) for all species, including the registered harvest (Appendix G). These variables will be used to develop species population trend indices beginning with the next report period.

The total number of animals taken during the 1993-94 report period increased by 25% over the 1992-93 period (Table 7). This increase may be the result of stable to increasing populations of most furbearer, predator, and nongame species populations in the state. Although pelt prices remained relatively depressed during the 1993-94 season, several species demonstrated slight increases in value, particularly beaver, marten and bobcat (Table 8). Significant increases were reported in the harvest of muskrat and raccoon.

Statewide species harvest trends, by trapping districts (or ecoregions), are presented in Figures 2 through 16. The statewide harvest of most species generally continued in an upward direction during 1993-94. This trend has occurred since the low harvests reported during 1990-91. These changes are variable, however, among the seven trapping districts or ecoregions. Harvest numbers may correspond to species abundance within each ecoregion or habitat base, although other variables, such as trapper effort and catch rate, may be more useful indicators to correlate harvest data with population trends. Under this assumption, there are specific implications for habitat and species management opportunities.

Results of carcass collections from fisher and wolverine, and skull turn-in's from marten and bobcat, are summarized and reported in the annual state wildlife laboratory report (Aune et al. 1994).

Statewide furbearer research activities generated three MS theses and one independent research report during the 1993-94 report period. The MS theses included two marten research projects in southwestern Montana and a fisher reintroduction project in northwestern Montana. The research report provided an assessment of metal contamination on semi-aquatic mammals (otter, mink, muskrat, raccoon) in westcentral Montana.

Figure 1. State map delineating trapping districts, ecosystems, and counties in Montana.

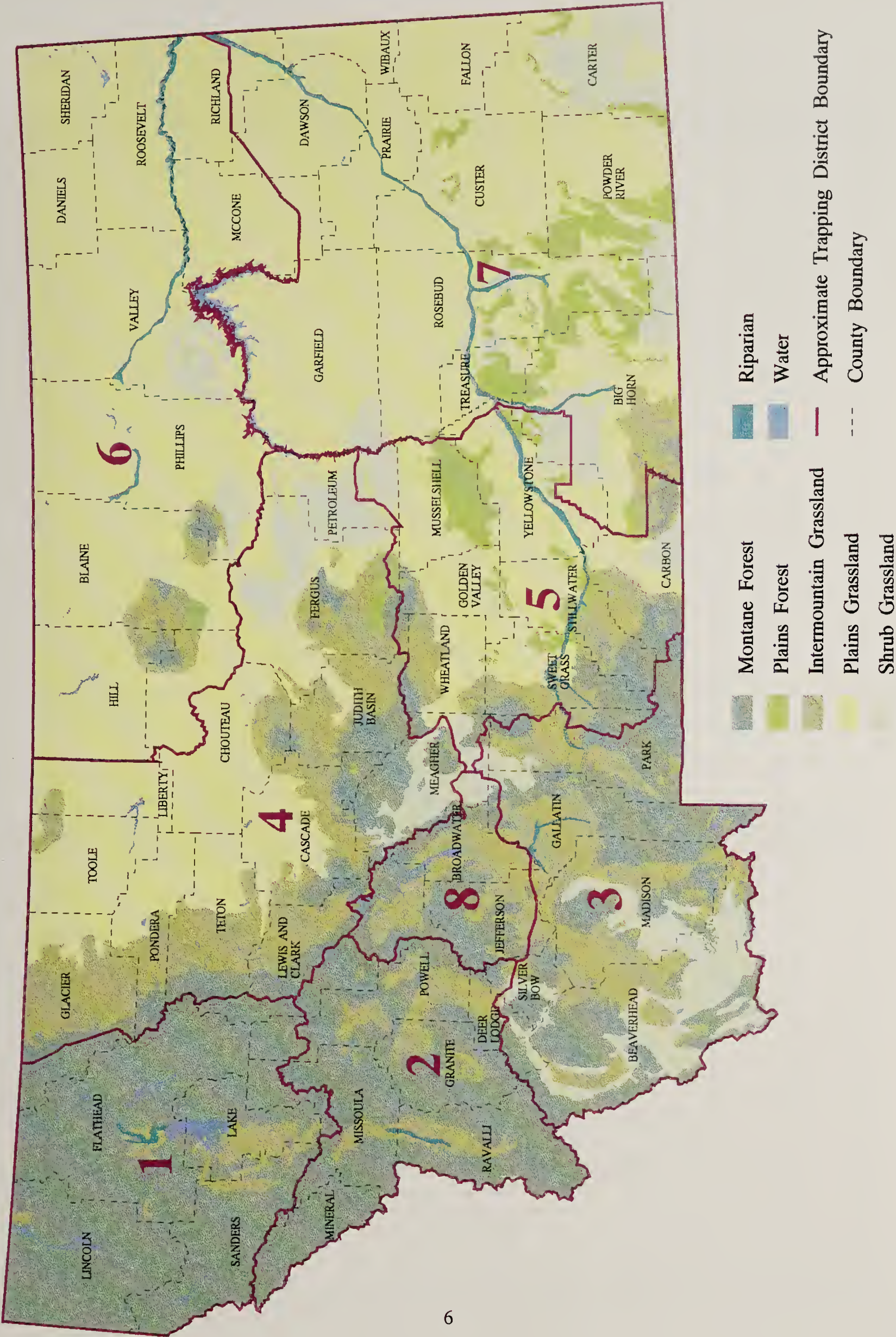


Table 1. Statewide summary of winter track survey results for selected species (NW & SW Montane ecoregions).

Year	1990-91	1991-92	1992-93	1993-94
# Routes	12 (1-3 times)	7 (1-3 times)	24 (1-3 times)	18 (1-3 times)
Total Miles	297	173	527	405
Hares	1181	1937	4227	2047
Squirrels	--	--	--	170
Marten	221	60	424	241
Fisher	0	0	1	4
Wolverine	1	0	5	4
Lynx	31	11	21	41
Bobcat	1	23	16	10
Lion	5	15	15	17
Weasel	--	--	--	114
Coyote	--	373	262	251

Table 2. Statewide indices of track detection rates (detection/100 miles) for selected species (NW & SW Montane ecoregions).

Year	1990-91	1991-92	1992-93	1993-94
Hares	398.0	1119.6	802.1	505.4
Squirrels	--	--	--	41.9
Marten	74.4	34.6	80.4	59.5
Fisher	0.0	0.0	0.2	1.0
Wolverine	0.3	0.0	0.9	1.0
Lynx	10.4	6.3	4.0	10.1
Bobcat	0.3	13.3	3.0	2.5
Lion	1.7	8.7	2.8	4.2
Weasel	--	--	--	28.1
Coyote	--	215.6	49.7	62.0

Table 3. Statewide summary of trapper and houndsman logbook reports for selected species (and # of counties).

Year	1990-91	1991-92	1992-93	1993-94
Number of logbooks	--	6	8	15
Fisher	--	1(1)	3(2)	8(4)
Wolverine	--	4(2)	9(2)	6(4)
Lynx	--	8(1)	16(4)	13(6)

Table 4. Statewide summary of FWP occurrence/distribution reports for selected species (and # of counties).

Year	1990-91	1991-92	1992-93	1993-94
Number of reports	--	10	8	22
Fisher	--	4(1)	2(1)	4(1)
Wolverine	--	2(2)	4(2)	4(3)
Lynx	--	4(3)	2(2)	18(7)

Table 5. Montana trapping and hunting license sales, 1993-94.

License Type	Kalispell	Missoula	Bozeman	Great Falls	Billings	Glasgow	Miles City	Helena	State
General	237	285	193	163	211	48	143	354	1,634
Youth	5	5	2	4	1	1	1	4	23
Landowner	6	5	18	51	32	4	79	28	223
Nonresident	0	0	0	1	0	0	3	0	4
Total	248	295	213	219	244	53	226	286	1,884

Table 6. Montana furbearer, predator and nongame species harvest summary, 1993-94.

Trapping District	1	2	3	4	5	6	7	Total*
Beaver	518	735	599	2,380	1,103	1,045	98	6,478
Otter	20	7	16	6	2	0	0	51
Muskrat	1,955	6,531	3,335	3,161	604	182	0	15,772
Mink	316	231	49	84	93	63	0	844
Marten	386	245	162	11	18	--	--	822
Fisher	4	3	--	--	--	--	--	7
Wolverine	3	1	4	1	0	--	--	9
Lynx	1	1	0	1	0	--	--	3
Bobcat	169	104	120	128	165	48	231	965
Weasel	84	133	82	5	3	3	16	327
Skunk	49	98	180	283	248	139	675	1,734
Coyote	607	849	1,797	2,208	1,391	493	2,407	9,766
Fox	109	270	988	678	1,209	354	2,415	6,047
Raccoon	79	531	594	896	1,378	185	392	4,067
Badger	8	3	264	177	19	35	332	839
TOTAL	4,308	9,742	8,190	10,019	6,233	2,547	6,566	47,731

*Figure may include animals harvested in unknown trapping district.

Table 7. Montana furbearer, predator and nongame species 10-year harvest summary, 1984-85 to 1993-94.

Year	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94
Beaver	10,378	14,636	18,142	12,356	8,987	8,710	5,497	5,133	5,707	6,478
Otter	40	50	62	38	30	45	26	35	35	51
Muskrat	25,849	18,270	32,706	41,578	23,766	12,538	10,778	12,260	6,912	15,772
Mink	2,155	1,886	2,762	3,964	3,148	2,144	1,175	1,192	841	844
Marten	2,392	2,444	2,366	2,393	2,426	1,283	736	996	603	822
Fisher	---	15	14	10	13	9	1	4	5	7
Wolverine	25	16	10	8	9	10	6	9	6	9
Lynx	64	37	23	15	22	15	2	3	2	3
Bobcat	1,746	1,375	1,438	1,277	832	622	370	1,062	947	965
Weasel	745	802	938	992	676	464	308	393	378	327
Skunk	6,978	7,442	8,378	7,958	4,743	1,525	1,384	1,649	1,548	1,734
Coyote	8,899	13,242	13,550	15,958	7,838	4,750	4,559	7,432	10,862	9,766
Fox	7,290	7,300	8,468	11,276	9,329	3,927	3,529	6,935	5,453	6,047
Raccoon	6,180	8,746	8,764	9,166	4,485	2,765	1,452	3,987	2,139	4,067
Badger	1,713	2,830	2,108	2,538	1,612	727	498	920	482	839
TOTAL	74,454	79,091	99,729	109,527	67,916	39,325	30,321	42,010	35,920	47,731

Table 8. Estimated average Montana pelt values, by species.

Year	1990-91	1991-92	1992-93	1993-94
Beaver	9.52	11.81	8.02	12.35
Otter	25.15	17.50	39.76	33.30
Muskrat	0.73	1.30	1.18	1.54
Mink	13.84	20.50	10.21	10.02
Marten	25.47	25.58	17.24	21.74
Fisher	35.00	40.00	35.00	32.74
Wolverine	140.00	130.00	135.00	147.80
Lynx	120.00	110.00	100.00	90.00
Bobcat	90.98	87.00	85.37	90.43
Weasel	0.27	2.25	3.50	2.00
Skunk	4.05	4.25	4.52	3.01
Coyote	13.01	23.95	22.18	15.78
Fox	8.45	22.50	11.17	10.68
Raccoon	4.32	8.28	10.68	10.10
Badger	5.29	7.65	8.38	6.82

Figure 2. Statewide beaver harvest by trapping district (and ecoregion), 1984-85 to 1993-94.

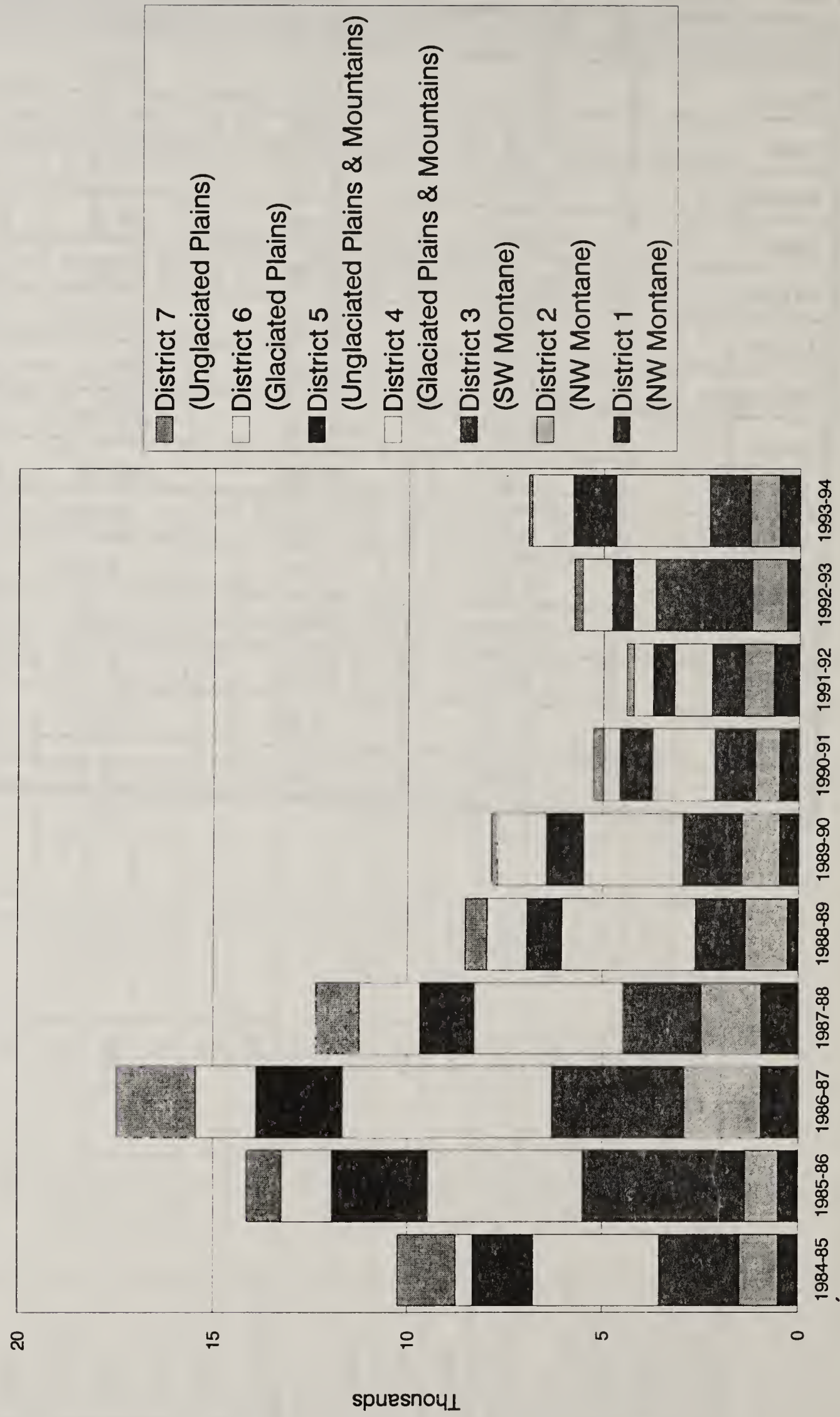


Figure 3. Statewide otter harvest by trapping district (and ecoregion), 1984-85 to 1993-94.

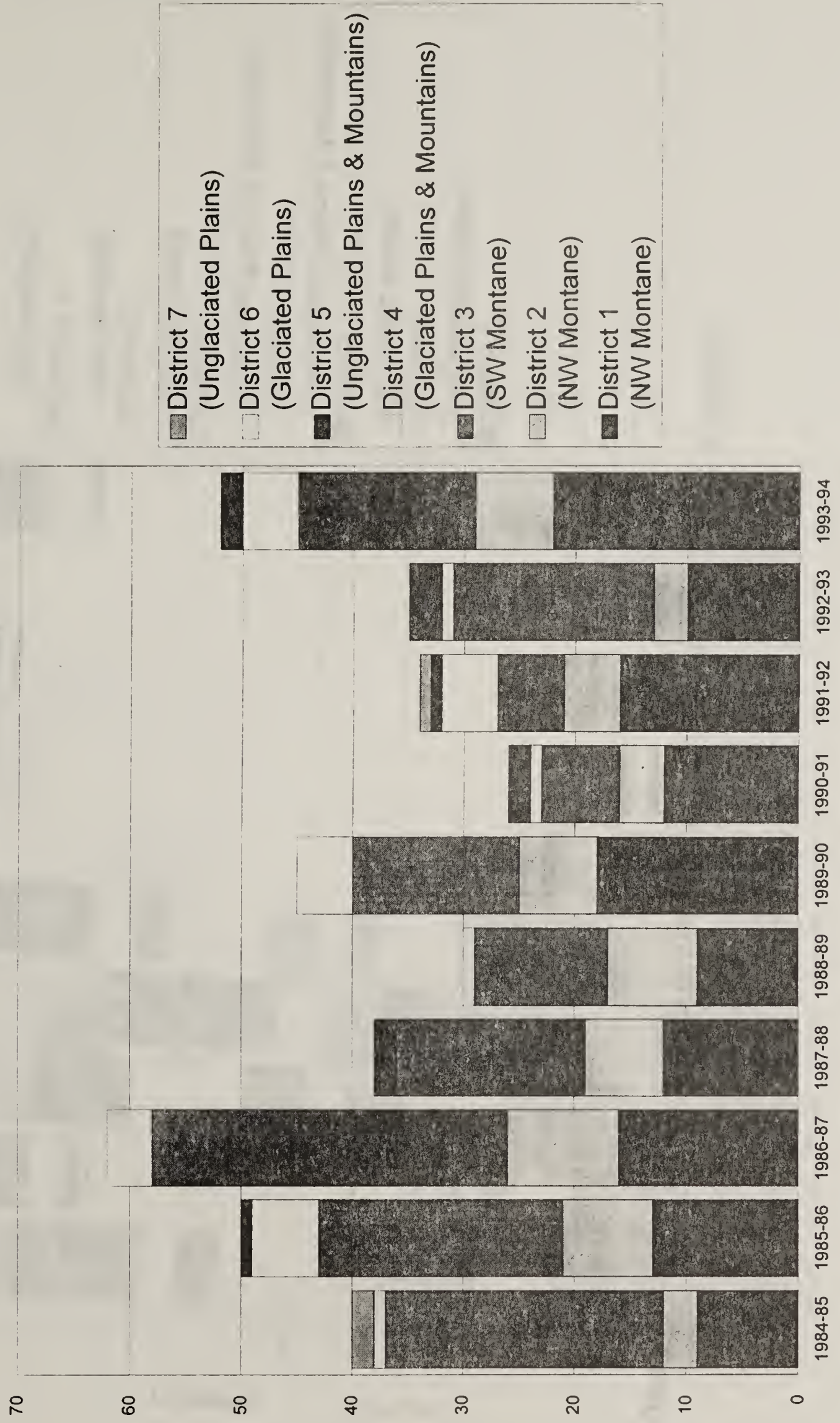


Figure 4. Statewide muskrat harvest by trapping district (and ecoregion), 1984-85 to 1993-94.

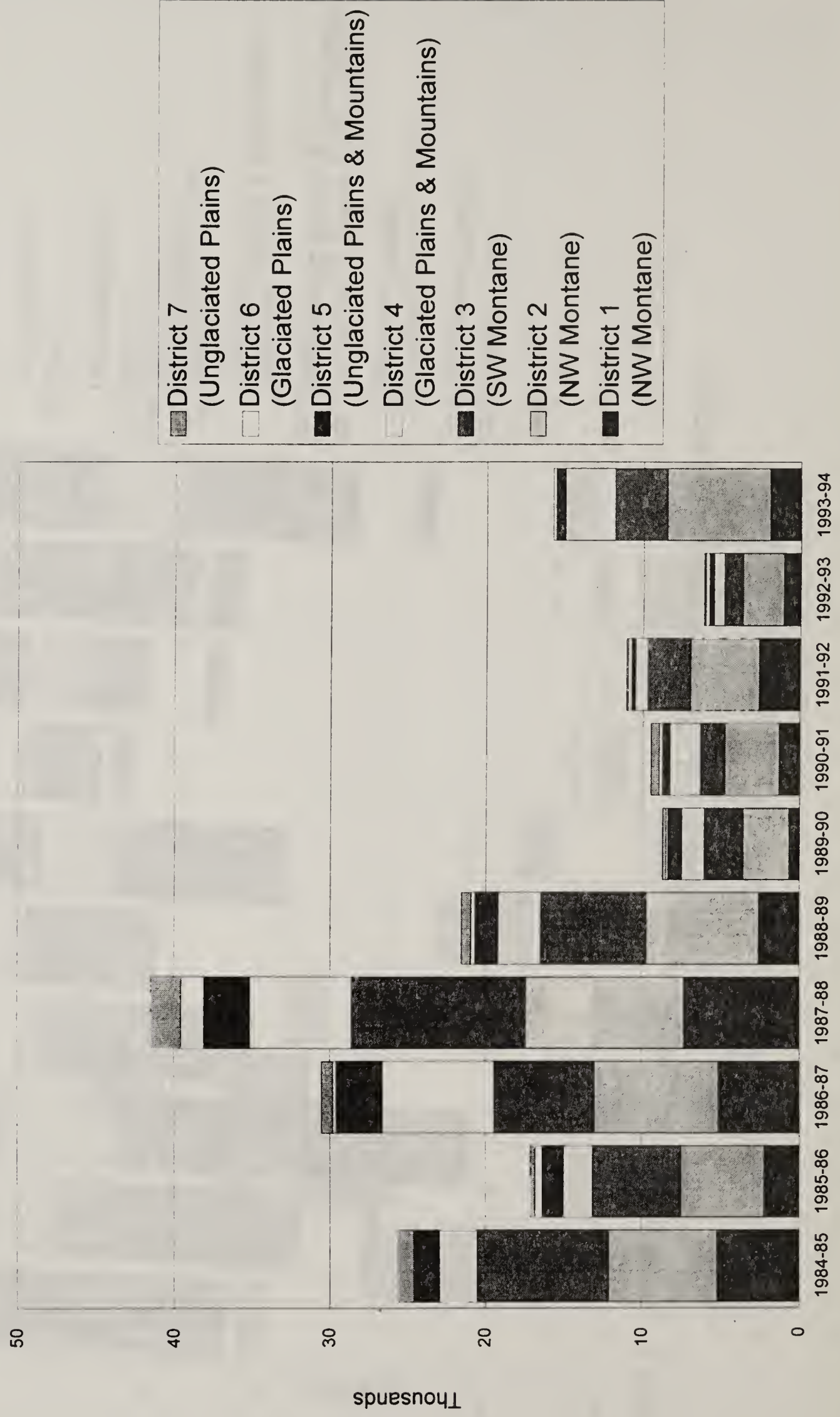


Figure 5. Statewide mink harvest by trapping district (and ecoregion), 1984-85 to 1993-94.

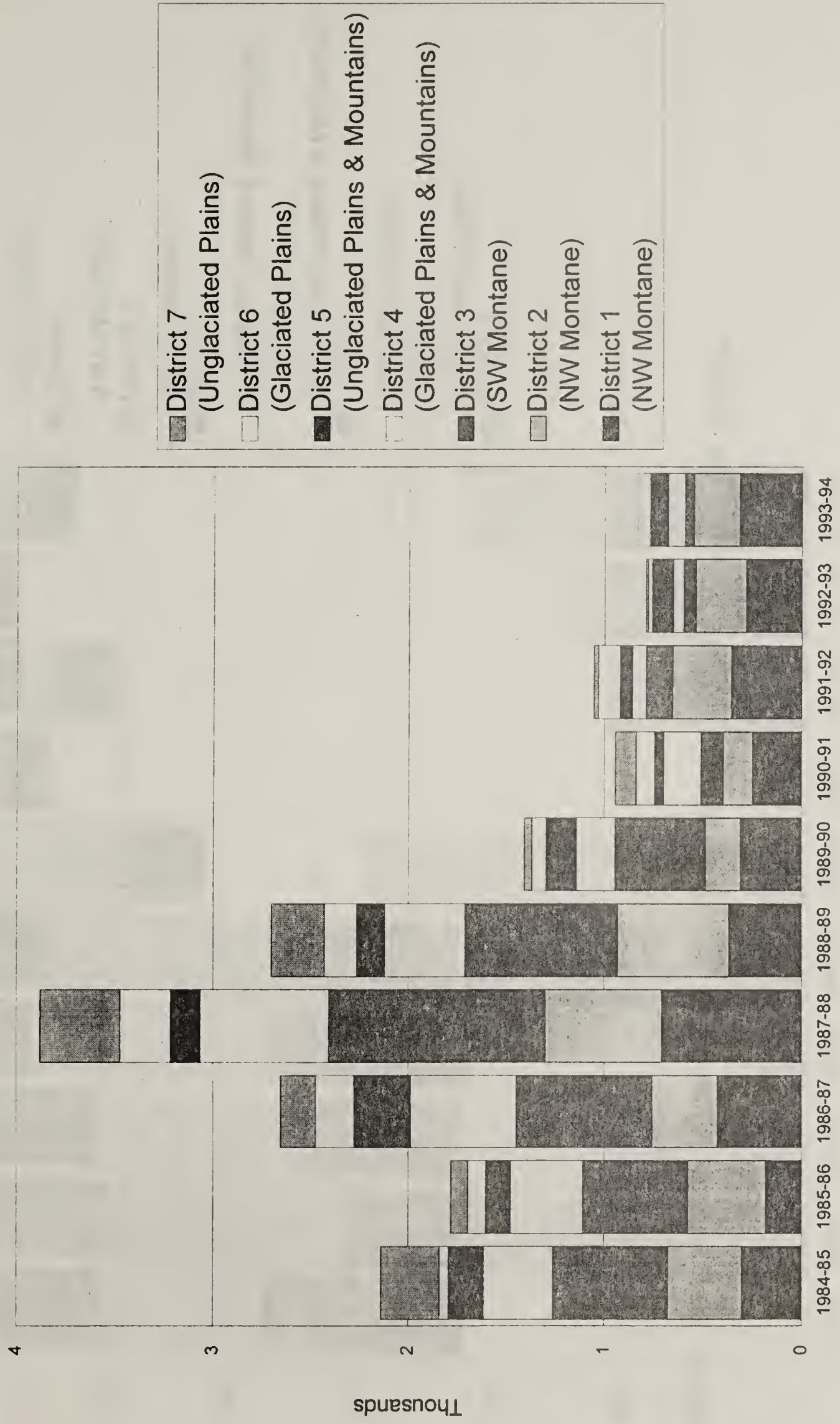


Figure 6. Statewide marten harvest by trapping district (and ecoregion), 1984-85 to 1993-94

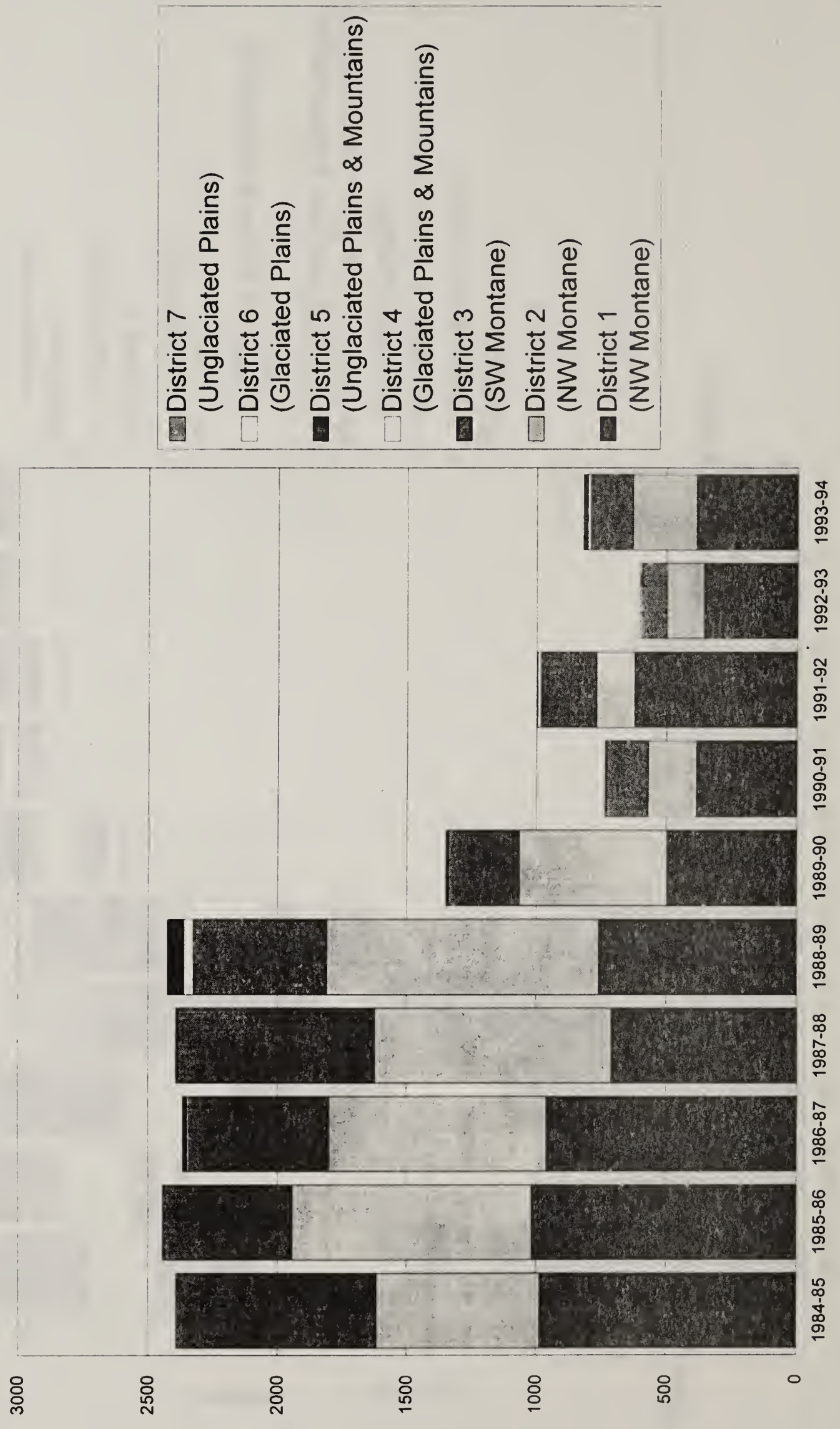


Figure 7. Statewide fisher harvest by trapping district (and ecoregion), 1984-85 to 1993-94.

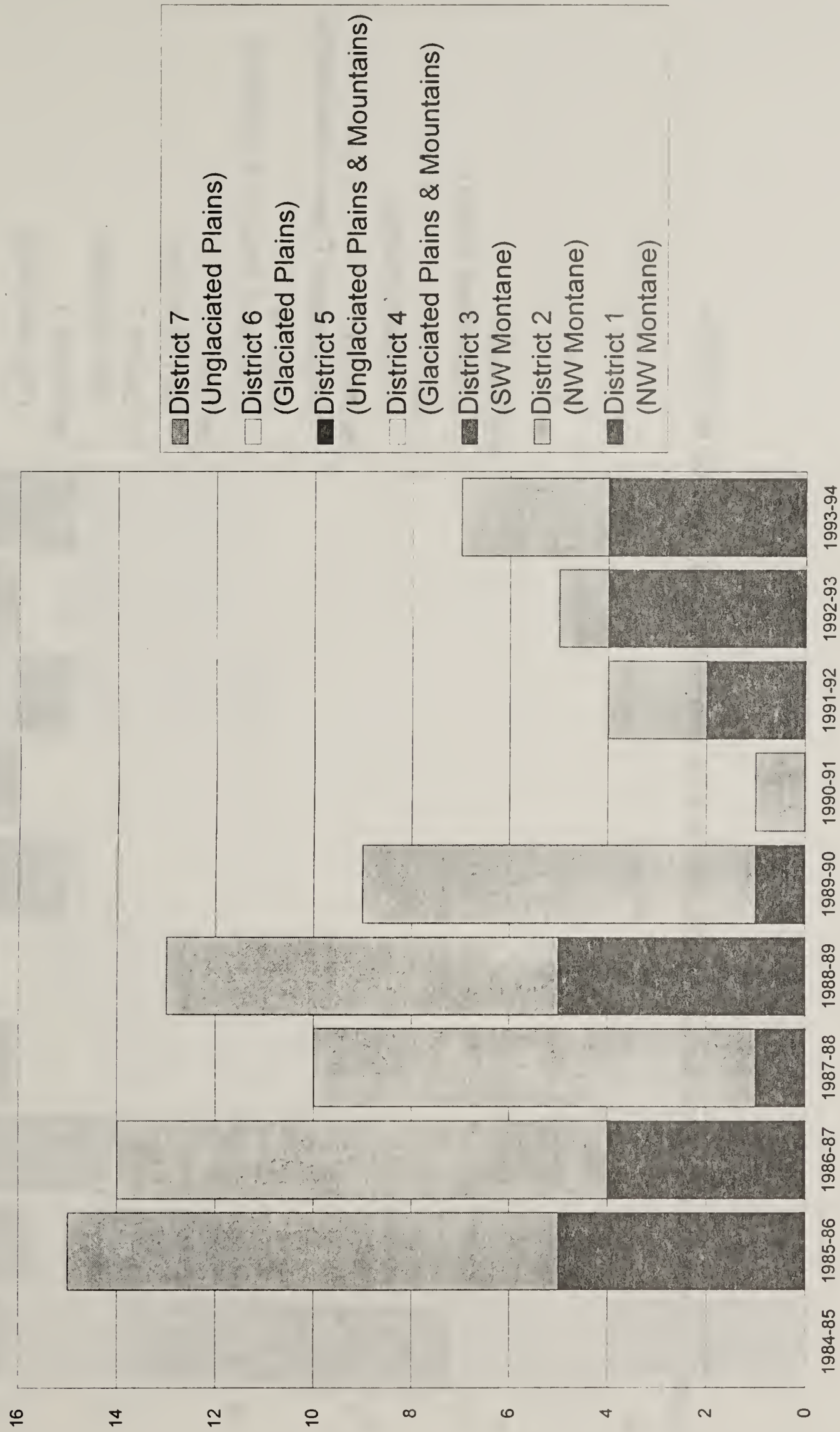


Figure 8. Statewide wolverine harvest by trapping district (and ecoregion), 1984-85 to 1993-94.

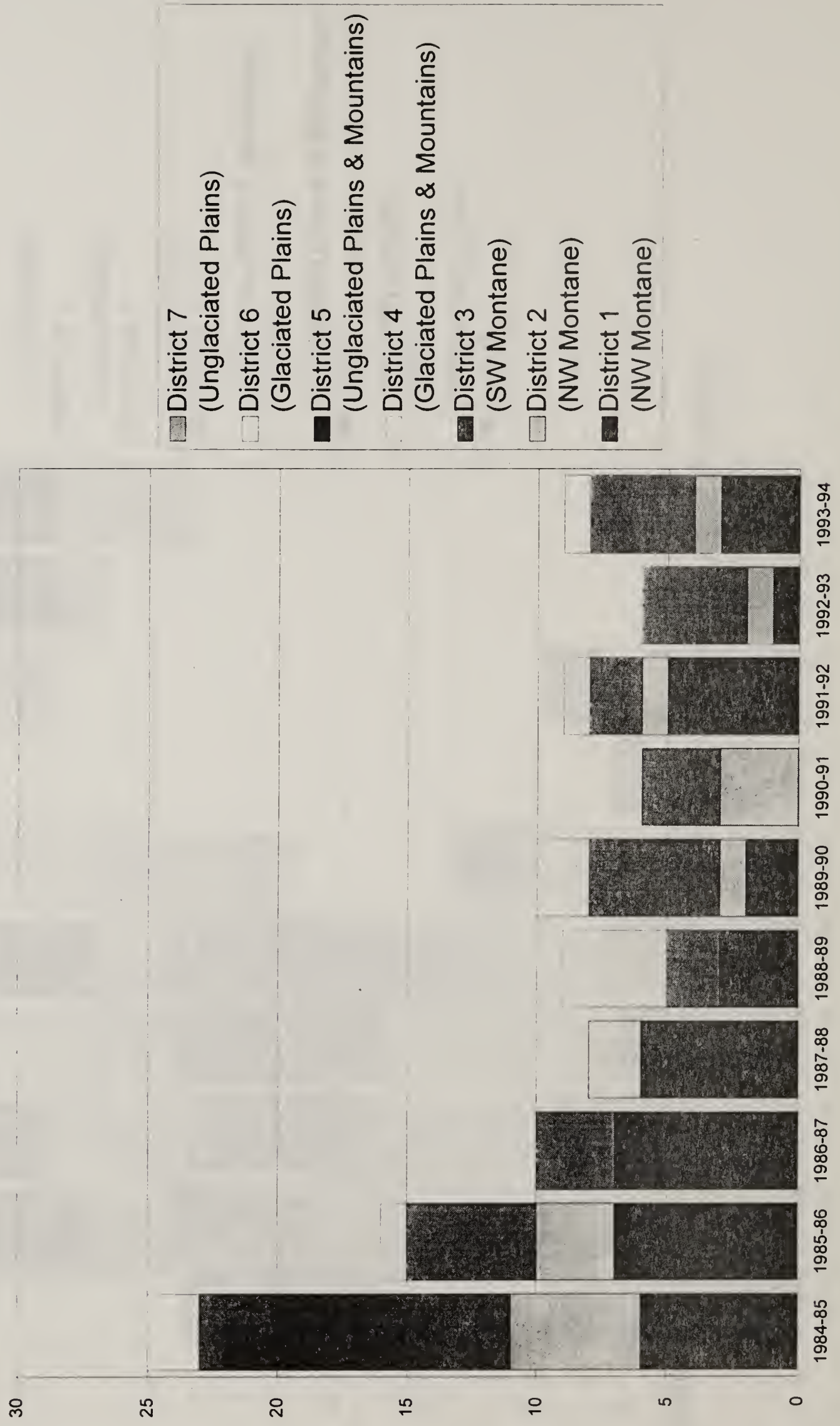


Figure 9. Statewide lynx harvest by trapping district (and ecoregion), 1984-85 to 1993-94.

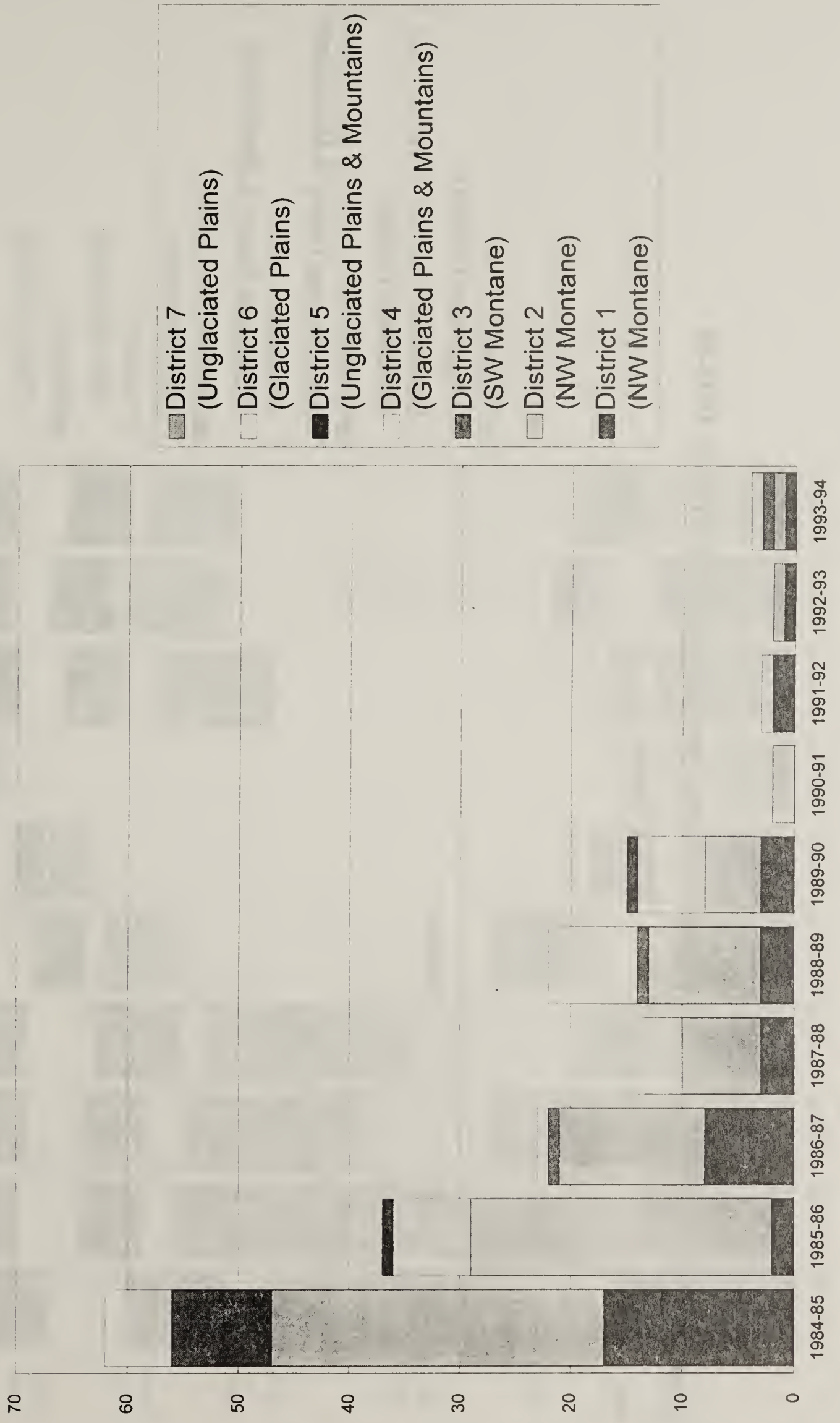


Figure 10. Statewide bobcat harvest by trapping district (and ecoregion), 1984-85 to 1993-94

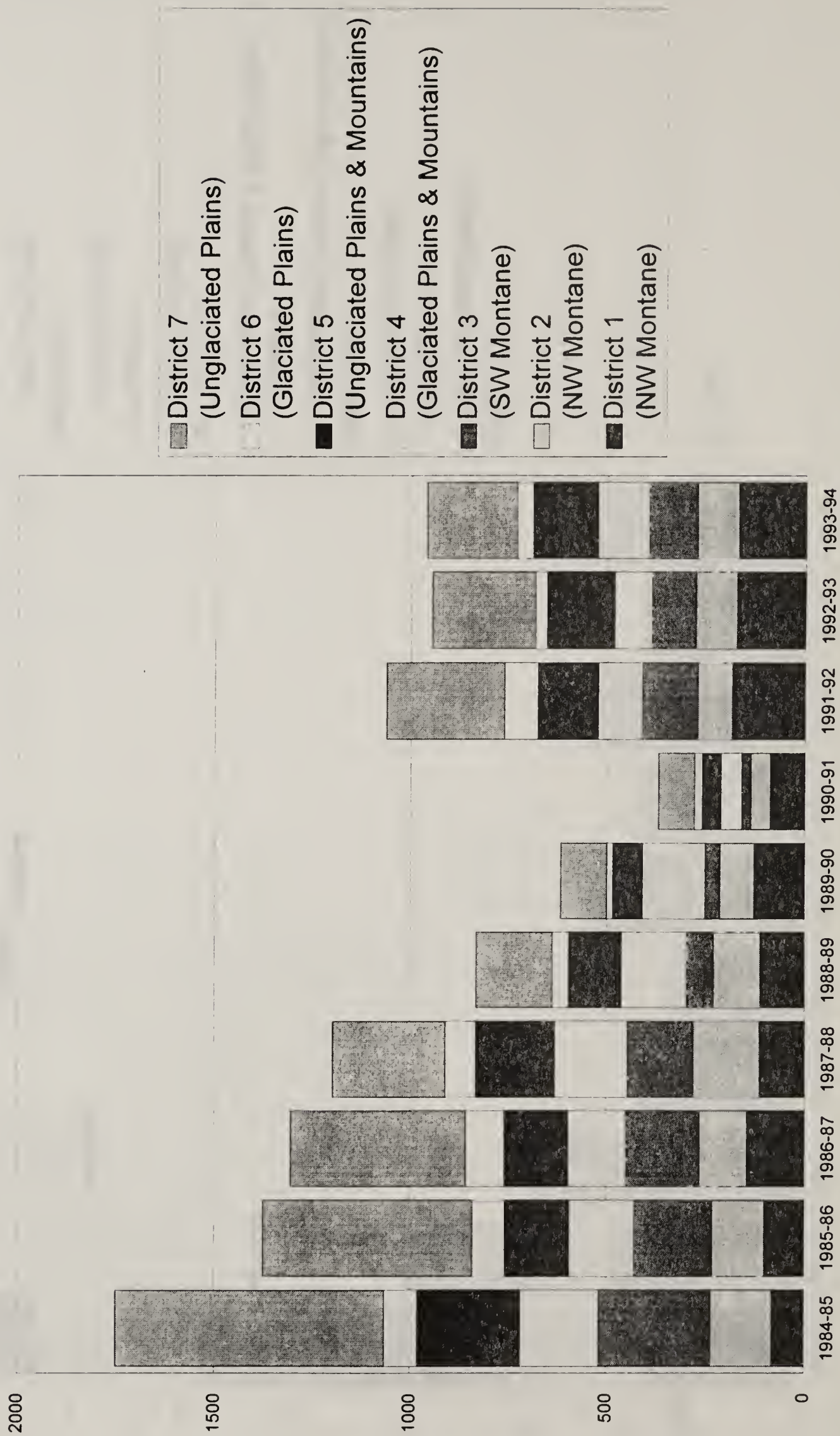


Figure 11. Statewide weasel harvest by trapping district (ecoregion), 1984-85 to 1993-94.



Figure 12. Statewide skunk harvest by trapping district (and ecoregion), 1984-85 to 1993-94.

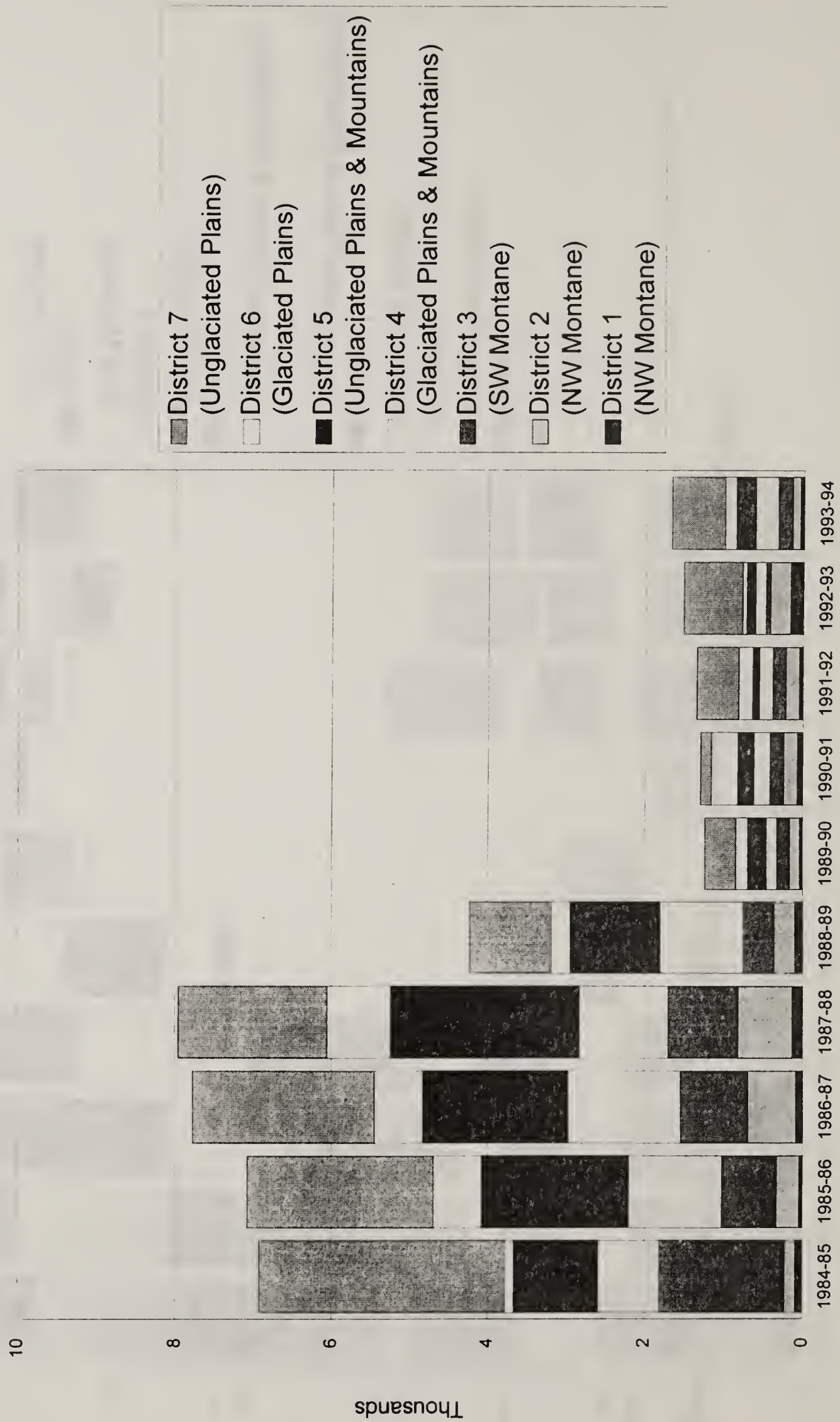


Figure 13. Statewide coyote harvest by trapping district (and ecoregion), 1984-85 to 1993-94.

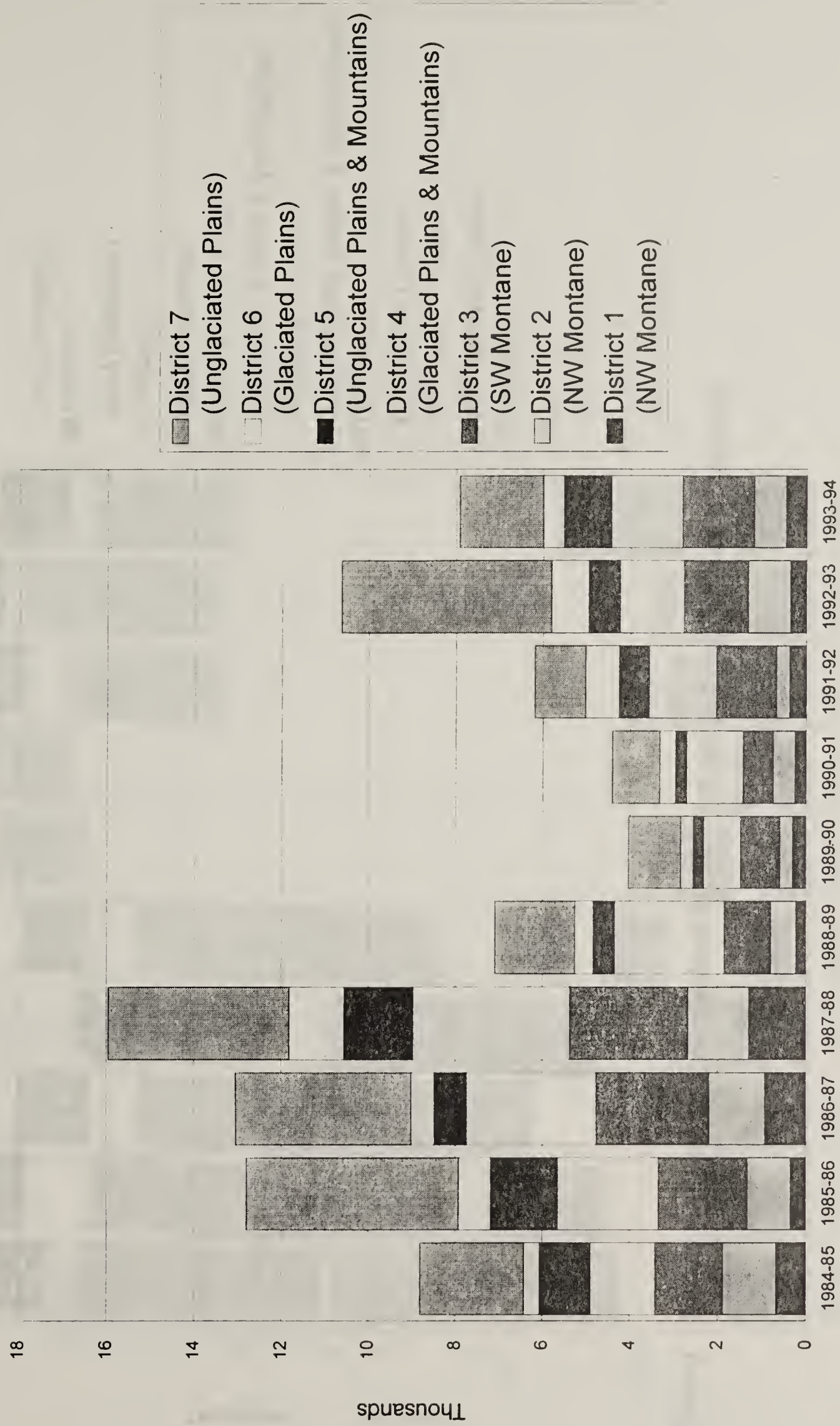


Figure 14. Statewide fox harvest by trapping district (and ecoregion), 1984-85 to 1993-94.

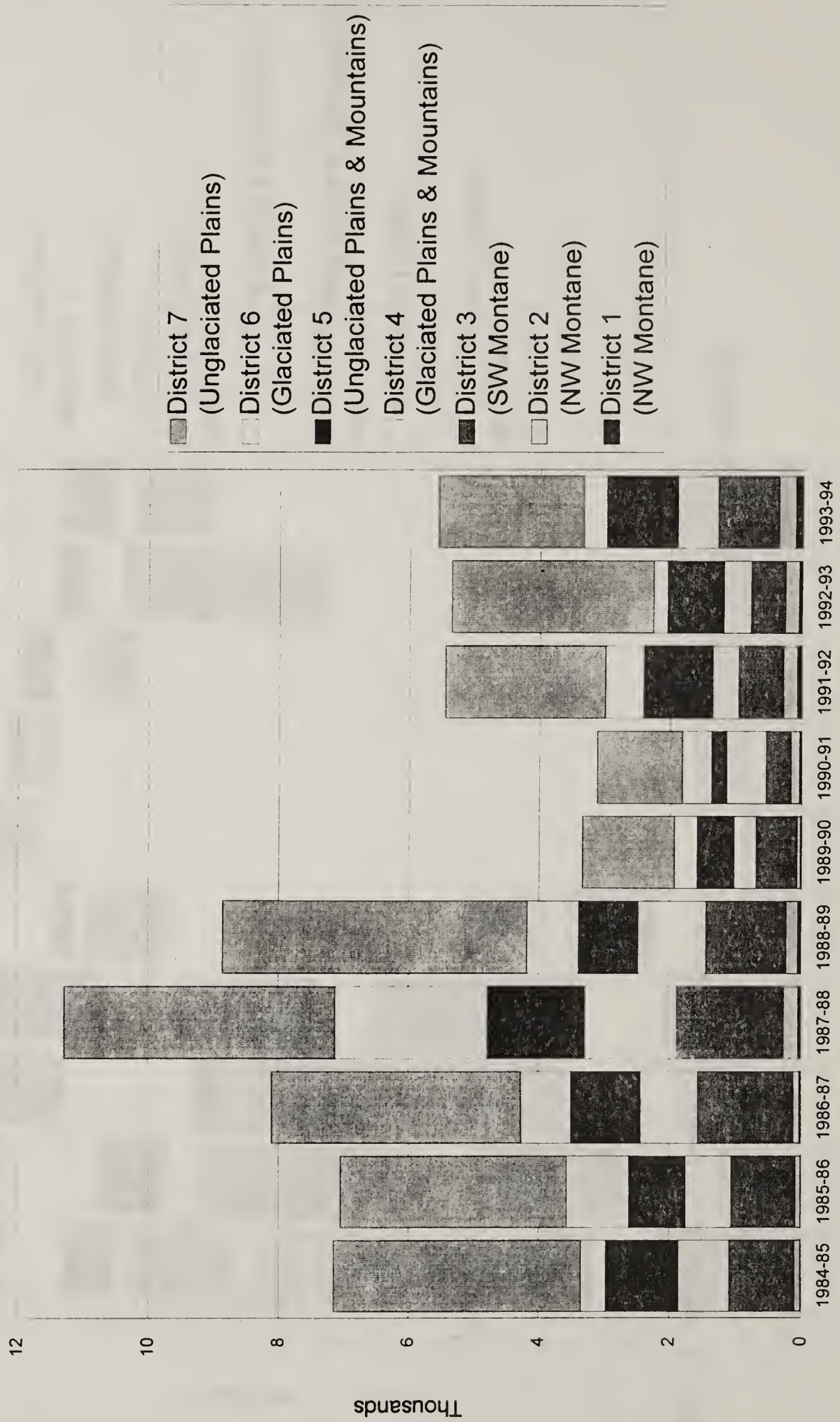


Figure 15. Statewide raccoon harvest by trapping district (and ecoregion), 1984-85 to 1993-94.

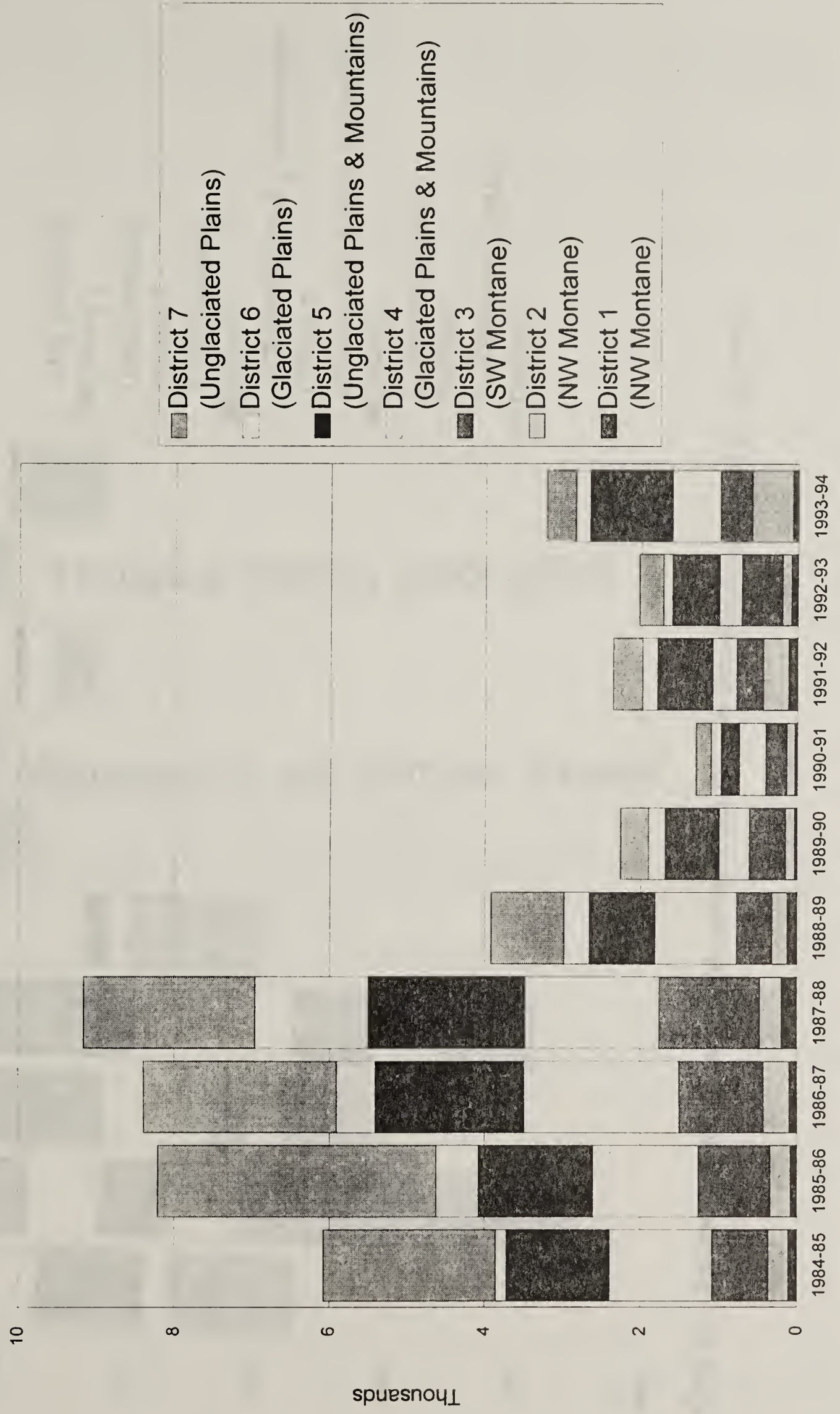
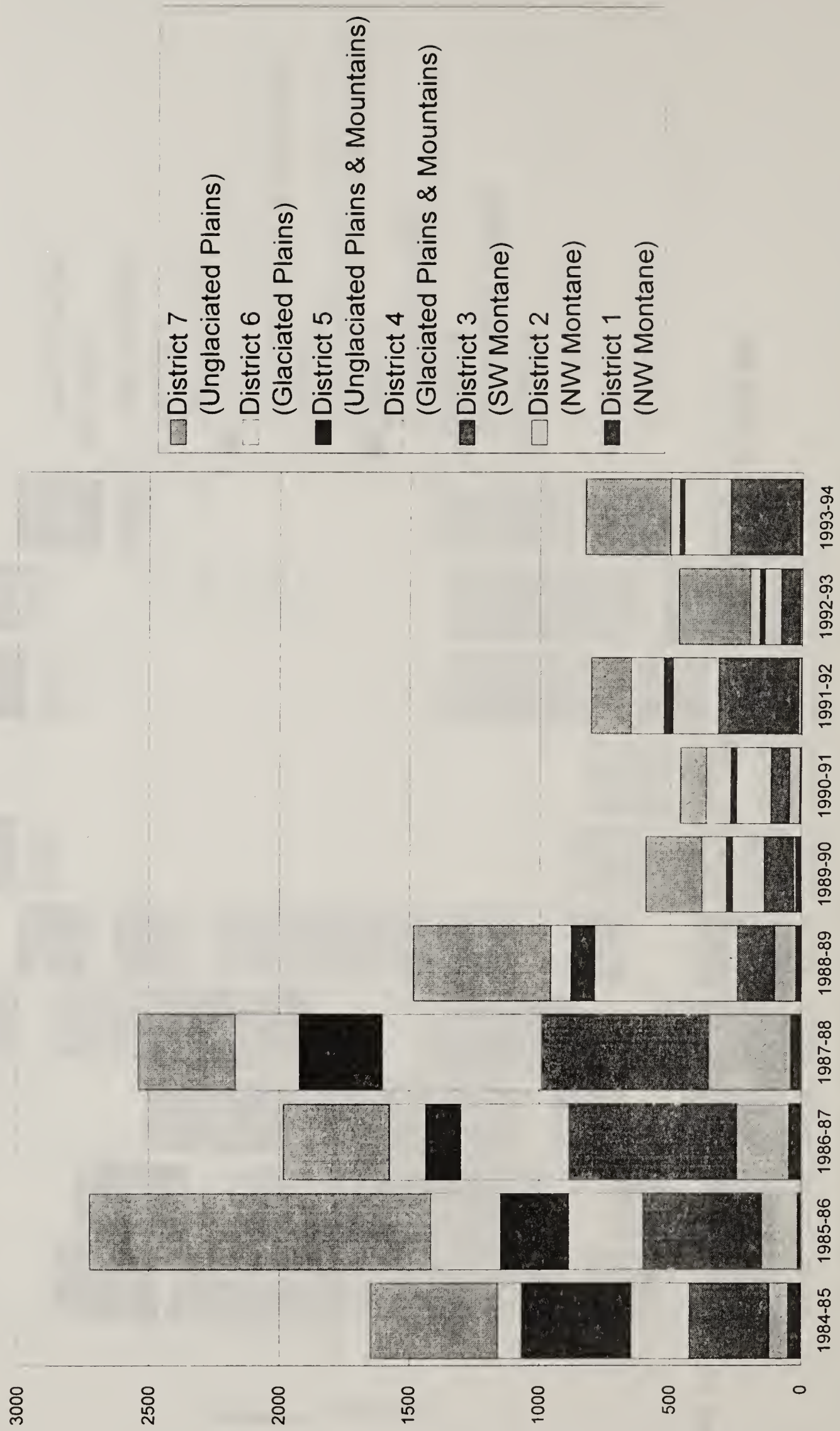


Figure 16. Statewide badger harvest by trapping district (and ecoregion), 1984-85 to 1993-94.



Trapping District (Ecoregion)

Management and Harvest Results

Trapping District 1 (NW Montana)

Ecoregion Description:

Counties: Includes all or portions of Flathead, Lake, Lincoln, and Sanders counties.

Habitat Conditions:

Management Direction:

Population Data:

Survey Routes: Tables 9 and 10.

Logbooks:

Occurrence Reports:

Harvest Statistics:

Harvest:

Trap Days:

Catch Rate:

Lab data presented - from carcass and skull collections in graph and table format with text. Sex, age structure and other biological information.

Trapping District (Ecoregion) Population Status and Trend:

Combine survey results, detection rates for selected species and prey indices, observation report results, trap days and catch rate (effort), and sex/age structure to predict trend in table format and in text form.

Recommendations or Management Evaluation:

Table 9. Summary of winter track survey results for selected species, Trapping District 1 (NW Montane ecoregion).

Year	1990-91	1991-92	1992-93	1993-94
# Routes	6 (1-2 times)	No data	11 (1-3 times)	4 (1 times)
Total Miles	100	--	251	116
Hares	--	--	1297	422
Squirrels	--	--	--	--
Marten	137	--	315	48
Fisher	0	--	1	3
Wolverine	0	--	5	3
Lynx	0	--	3	4
Bobcat	0	--	6	3
Lion	0	--	11	5
Weasel	--	--	--	16
Coyote	--	--	--	55

Table 10. Indices of track detection rates(detections/100 miles) for selected species, Trapping District 1 (NW Montane ecoregion).

Year	1990-91	1991-92	1992-93	1993-94
Hares	--	No data	515.7	363.5
Squirrels	--	--	--	--
Marten	137.0	--	125.2	3.4
Fisher	0.0	--	0.4	2.6
Wolverine	0.0	--	2.0	2.6
Lynx	0.0	--	1.2	3.4
Bobcat	0.0	--	2.4	2.6
Lion	0.0	--	4.4	4.3
Weasel	--	--	--	13.8
Coyote	--	--	--	47.4

Trapping District 2 (NW Montana)

Ecoregion Description:

Counties: Includes all or portions of Deer Lodge, Granite, Mineral, Missoula, Powell, and Ravalli counties.

Habitat Conditions:

Management Direction:

Population Data:

Survey Routes: Tables 11 and 12.

Logbooks:

Occurrence Reports:

Harvest Statistics:

Harvest:

Trap Days:

Catch Rate:

Lab data presented - from carcass and skull collections in graph and table format with text. Sex, age structure and other biological information.

Trapping District (Ecoregion) Population Status and Trend:

Combine survey results, detection rates for selected species and prey indices, observation reports results, trap days and catch rate (effort), and sex/age structure to predict trend in table format and in text form.

Recommendations or Management Evaluation:

Table 11. Summary of winter track survey results for selected species, Trapping District 2 (NW Montane ecoregion).

Year	1990-91	1991-92	1992-93	1993-94
# Routes	3 (3 times)	No data	3 (1-2 times)	10 (1-2 times)
Total Miles	114	--	70	144
Hares	438	--	789	765
Squirrels	--	--	--	--
Marten	--	--	0	63
Fisher	--	--	0	1
Wolverine	--	--	0	0
Lynx	23	--	6	29
Bobcat	--	--	2	6
Lion	--	--	0	6
Weasel	--	--	0	29
Coyote	--	--	0	70

Table 12. Indices of track detection rates (detections/100 miles) for selected species, Trapping District 2 (NW Montane ecoregion).

Year	1990-91	1991-92	1992-93	1993-94
Hares	384.2	No data	1127.1	531.2
Squirrels	--	--	--	--
Marten	--	--	0.0	43.7
Fisher	--	--	0.0	0.7
Wolverine	--	--	0.0	0.0
Lynx	20.2	--	8.6	20.1
Bobcat	--	--	2.8	4.2
Lion	--	--	0.0	4.2
Weasel	--	--	0.0	20.2
Coyote	--	--	0.0	48.6

Trapping District 3 (SW Montane)

Ecoregion Description:

Counties: Includes all or portions of Beaverhead, Broadwater, Gallatin, Jefferson, Madison, Park, and Silver Bow counties.

Habitat Conditions:

Management Direction:

Population Data:

Survey Routes: Tables 13 and 14.

Logbooks:

Occurrence Reports:

Harvest Statistics:

Harvest:

Trap Days:

Catch Rate:

Lab data presented - from carcass and skull collections in graph and table format with text. Sex, age structure and other biological information.

Trapping District (Ecoregion) Population Status and Trend:

Combine survey results, detection rates for selected species and prey indices, observation report results, trap days and catch rate (effort), and sex/age structure to predict trend in table format and in text form.

Recommendations or Management Evaluation:

Table 13. Summary of winter track survey results for selected species, Trapping District 3 (SW Montane ecoregion).

Year	1990-91	1991-92	1992-93	1993-94
# Routes	3 (1-2 times)	7 (1-3 times)	10 (1-3 times)	4 (1-3 times)
Total Miles	83	173	206	145
Hares	743	1937	2141	860
Squirrels	--	--	--	170
Marten	84	60	109	130
Fisher	0	0	0	0
Wolverine	1	0	0	1
Lynx	8	11	12	8
Bobcat	1	23	8	1
Lion	5	15	4	6
Weasel	--	--	--	69
Coyote	--	373	262	126

Table 14. Indices of track detection rates (detection/100 miles) for selected species, Trapping District 3 (SW Montane ecoregion).

Year	1990-91	1991-92	1992-93	1993-94
Hares	892.0	1120.3	1038.3	591.0
Squirrels	--	--	--	116.8
Marten	100.8	34.7	52.9	89.3
Fisher	0.0	0.0	0.0	0.0
Wolverine	1.2	0.0	0.0	0.7
Lynx	9.6	6.3	5.8	5.5
Bobcat	1.2	13.3	3.8	0.7
Lion	6.0	8.7	1.9	4.1
Weasel	--	--	--	47.4
Coyote	--	215.7	127.1	86.6

Trapping District 4 (Glaciated Plains and Mountains)

Ecoregion Description:

Counties: Includes all or portions of Cascade, Chouteau, Fergus, Glacier, Judith Basin, Lewis & Clark, Liberty, Meagher, Petroleum, Pondera, Teton, and Toole counties.

Habitat Conditions:

Management Direction:

Population Data:

Surveys: (Snow track surveys/lagomorph surveys for bobcats)

Logbooks:

Occurrence Reports:

Harvest Statistics:

Harvest:

Trap Days:

Catch Rate:

Lab data presented - carcass and skull collections in graph and table format with text. Sex, age structure and other biological information.

Trapping District (Ecoregion) Population Status and Trend:

Combine survey results, observation report results, trap days and catch rate (effort), and sex/age structure to predict trend in table format and in text form.

Recommendations or Management Evaluation:

Trapping District 5 (Unglaciaded Plains and Mountains)

Ecoregion Description:

Counties: Includes all or portions of Bighorn, Carbon, Golden Valley, Musselshell, Stillwater, Sweet Grass, Wheatland, Yellowstone counties.

Habitat Conditions:

Management Direction:

Population Data:

Surveys: (lagomorph for bobcats)

Logbooks:

Occurrence Reports:

Harvest Statistics:

Harvest:

Trap Days:

Catch Rate:

Lab data presented - from skull collections in graph and table format with text. Sex, age structure and other biological information.

Trapping District (Ecoregion) Population Status and Trend:

Combine survey results, trap days and catch rate (effort), and sex/age structure to predict trend in table format and in text form.

Recommendations or Management Evaluation:

Trapping District 6 (Glaciated Eastern Plains)

Ecoregion Description:

Counties: Includes all or portions of Blaine, Daniels, Hill, McCone, Phillips, Richland, Roosevelt, Sheridan, and Valley counties.

Habitat Conditions:

Management Direction:

Population Data:

Surveys: (lagomorph for bobcats)

Logbooks: (swift fox, otter)

Occurrence Reports: (swift fox, otter)

Harvest Statistics:

Harvest:

Trap Days:

Catch Rate:

Lab data presented - from bobcat skull collections in graph and table format with text.
Sex, age structure.

Trapping District (Ecoregion) Population Status and Trend:

Combine survey results, trap days and catch rate (effort), and sex/age structure to predict trend in table format and in text form.

Recommendations or Management Evaluation:

Trapping District 7 (Unglaciaded Eastern Plains)

Ecoregion Description:

Counties: Includes all or portions of Carter, Custer, Dawson, Fallon, Garfield, Powder River, Prairie, Rosebud, Treasure, and Wibaux counties.

Habitat Conditions:

Management Direction:

Population Data:

Surveys: (lagomorph for bobcats)

Logbooks: (swift fox and otter)

Occurrence Reports: (swift fox and otter)

Harvest Statistics:

Harvest:

Trap Days:

Catch Rate:

Lab data presented - from bobcat skull collections in graph and table format with text.
Sex, age structure.

Trapping District (Ecoregion) Population Status and Trend:

Combine survey results, trap days and catch rate (effort), and sex/age structure to predict trend in table format and in text form.

Recommendations or Management Evaluation:

Literature Cited

- Aune, K.E., and P. Schladweiler. 1994. Wildlife laboratory annual report. February 1995. Montana Dept. of Fish, Wild. and Parks. Helena, MT 83 p.
- Haskins, C., B. Hoskins, and T. Lonner. 1994. Trapping and fur harvest report. September 1994. Montana Dept. of Fish, Wild. and Parks. Helena, MT 37 p.
- Halfpenny, J.C. 1993. Field verification of low density mammals. A Naturalist's World, Gardiner, MT 56p.
- Lemke, T. 1993. Montana Dept. of Fish, Wildlife and Parks Wildlife Program, Federal Aid Grant Proposal (1993-1999). MDFWP, Helena, MT 171pp.
- Zielinski, W.J., and T.E. Kurera, eds. 1994. DRAFT Survey methods for the detection of lynx, wolverines, fishers, and martens. US Forest Service, Pacific Southwest Research Station, Redwood Sciences Laboratory and Wildlife Department, Humboldt State Univ., Arcadia, CA 178 p.

APPENDICIES

Appendix A.	Snow Tracking and Habitat Form	39
Appendix B.	Track Observation Form	41
Appendix C.	Trapper's Log Track-Sighting-Trapped Form	42
Appendix D.	Furbearer Occurrence/Distribution Report	43
Appendix E.	Furbearer Harvest Registration	44
Appendix F.	Furbearer Harvest Survey	45
Appendix G.	Statewide harvest statistics illustrating trapper effort and calculated catch rates as variables for developing species population trend indicies	47
Appendix H.	Furbearer Research Activities	49

Snow Tracking and Habitat Form

Observer _____ Date _____ Sheet _____ of _____

Sample Unit number _____ Days since last snow _____

Survey Area _____

General Comments _____

[illegible]

*Describe the Snow Tracking Quality (STQ) using the chart on the back of this page.

Snow Tracking Quality

Snow tracking quality (STQ) refers to the ability of the snow to preserve an identifiable foot print and trail. Records of STQ are kept to verify adequacy of a track survey. If at the end of the day, snow quality over much of the route has been inadequate (mostly 1s and 0s) to record and identify prints, the route may have to be resurveyed another day.

STQ should be rated every time a change in quality occurs. The rating refers to the section of the route just travelled and refers to conditions at the time of observation, not conditions at the time the print was made. STQ integrates two factors: conditions at the time the track was made, and weather conditions since tracks originated. Clear tracks which rated high originally may be disintegrating by the time the observer finds them. During the course of a day, STQ usually deteriorates, especially as the sun melts the snow.

When STQ is between two categories, give a decimal rating to indicate intermediate conditions, i.e. 3.7. Averaged ratings may be given when conditions vary over short distances; use a "V" for variable, i.e. 3.2V. When conditions vary continually, i.e. when descending a mountain slope or on a fast warming day, record the STQ frequently. Conditions often vary dramatically from one compass aspect to another.

Description of STQ Ratings

Rating 4: Best, every footprint registers and detail within prints is very clear. Species identification is essentially absolute based on track details.

Rating 3: Good, every print registers, but details are weak, perhaps obliterated by snow falling into print. Print details usually visible in microtopographic sites, i.e. tree wells and shadows. Identification is based on track details but gait patterns offer needed support.

Rating 2: Acceptable, some prints fail to register, and footprint details, if present, are visible only in microtopographic sites. Identification based primarily on gait patterns.

Rating 1: Poor, many prints do not register. Track details lacking. Identification is essentially by gait patterns, and may only be possible in microtopographic sites.

Rating 0: - Unacceptable, target species does not leave enough prints to identify gait patterns left in trails.

Snow Surface Quality Ratings Summary

Rating	Prints	Detail	Detail Location	Gait Patterns	Identification
4	every print registers	clear within print	all locations	distinctive	by tracks, essentially absolute
3	every print registers	weak, snow obliteration	details in microtopographic sites	gain importance	by prints and gaits
2	some do not register	no details in open	only in microhabitats	important	by gaits, clues from details
1	many do not register	no details	no details	sole clue	by gaits
0	most prints do not register	no detail	no detail	not complete	not possible

Example

Snow Tracking and Habitat Form

Observer Jim Halfpenny Date April 15, 1990 Sheet 1 of 1
 Sample Unit number 121 Days since last snow 2
 Survey Area Vail Ski Area, back bowl #1, Colorado
 General Comments Variable snow conditions worsening during the day

Time	Distance from Start	Canids	Felids	Mustelids	Prey Species	Habitat	STQ	Notes
09:57								Left trailhead
10:18	0.25 mi	C2		W3	H3 S4	O	4	Collected sack
10:41	0.55			W2	H8 S7	SF	3.5	1 BLUE GROUSE TRACKS
11:06	0.75							climbing skins on
11:23	2.0	F1 C2	B1	M1 W4	H6 S7	LP	4	TOP KNOB 11,618 ft
11:35	2.3				H7 S1	SF	1	snow melting
12:34	4.1	C1		M1 W1	H1	SF	1.5V	SINCE 11:35 STQ=1 MOSTLY, STOP SURVEY

Notes: C = coyote, F = fox, B = bobcat, W = weasel, M = marten, H = snowshoe hare, S = pine squirrel

Comments on Example

This survey was looking for lynx and wolverine. None were found. The survey had to be terminated at 12:34 because of deteriorating snow conditions. Numbers following a species code indicate the number of trails crossed since the last entry that recorded species. For example, the 11:23 entry includes all animals since 10:41. entries should be made when ever habitat changes or the number of individual tracks becomes too large to remember. Habitat codes can be official Forest Service designations.

Track Observation Form

Species Observed _____ Number observed _____

Date _____ Time _____ Observers _____

Location _____

Legal Description (fill out in the laboratory) : Section _____ Township _____

Range _____ Meridian _____

Habitat _____

Elevation _____ Topography _____

Tracking Surface _____

Measurements units are **cm** or **in** (mark out the units **NOT** used)

M1, M2, M3 refer to sequential measurements on one trail, i.e. 3 strides or 3 right front prints

Gait	M1	M2	M3	Mean	STD
Stride					
Group					
Straddle					
Center Straddle					
Trough					

Photograph Record		
Film and ASA	Roll Number	Frames

	Length					Width				
Prints	M1	M2	M3	Mean	STD	M1	M2	M3	Mean	STD
Front										
Hind										
Metatarsal										

Comments and Drawings (make drawings on the back of this form)

[illegible][illegible]



Montana Department of Fish, Wildlife & Parks

FURBEARER OCCURRENCE/DISTRIBUTION REPORT

COMPLETED BY:

Name: _____ Phone: _____

Address: _____ City: _____

SPECIES OBSERVED: (Check/report only one species per form)

LYNX _____ FISHER _____ WOLVERINE _____ SWIFT FOX _____ OTTER _____

TYPE OF OBSERVATION: (Check type)

Tracks _____ Scat _____ Sighting _____ Other _____

OBSERVER: (If different then completed by)

Name: _____ Phone: _____

Address: _____ City: _____

LOCATION INFORMATION:

Date	County	Location	T	R	Sec
_____	_____	_____	_____	_____	_____

Remarks: _____

Date	County	Location	T	R	Sec
_____	_____	_____	_____	_____	_____

Remarks: _____



Montana Department of Fish, Wildlife & Parks

FURBEARER HARVEST REGISTRATION

FURHARVESTER:

Name: _____ Trapping License No: _____

Address: _____ City: _____ Phone: _____

SPECIES HARVESTED: (Check/register only one species per form)

¹DISTRICT QUOTA #: _____

BOBCAT¹ _____ LYNX¹ _____ OTTER _____ MARTEN _____ FISHER¹ _____ WOLVERINE _____

HARVEST METHOD:

Trap _____ Snare _____ Conibear _____ Freeshot _____ Hounds _____ Livetraps _____ Other _____

HARVEST INFORMATION:

Date(s) Taken	Trapping District (1-7)	County	Location	T	R	Sec	Pelt Tag Number ²	Sex ³
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____

MARTEN:

²Number of Tagged Marten _____ ³(#Males _____ #Females _____)

Tag No.'s (optional) _____

It is mandatory that the carcasses of lynx, fisher and wolverine, and the skulls of bobcat and marten be turned in at the time of pelt tagging. It is voluntary to also collect otter carcasses for biological analysis. Forward all specimens to a regional office or to the department's wildlife lab in Bozeman.

In accordance with section 87-2-103, I hereby certify that the above statements are true and correct to the best of my knowledge.

Owner's Signature

Date 44

DFWP Officer/Employee

FURBEARER HARVEST SURVEY



**Montana Fish,
Wildlife & Parks**

Appendix F.

Although you may have already provided some information on several furbearers, this survey includes ALL trapping, snaring, hunting, and hound handling activities related to the species listed below. This is a statewide survey of ALL trapping license holders. The information you provide is vital to a successful furbearer management program.

EVEN IF YOU DID NOT TRAP, SNARE OR HUNT,
PLEASE ANSWER #1 AND RETURN THIS QUESTIONNAIRE.

1. Did you trap, snare, hunt, or use hounds during the 1995-96 furbearer season? ☐ NO ☐ YES

**QUESTION 2 REFERS TO YOUR TRAPPING/SNARING ACTIVITIES;
QUESTION 3 AND 4 REFER TO HUNTING AND THE USE OF HOUNDS.**

**NOTE: IF YOU TRAPPED, SNARED OR HUNTED IN MORE THAN ONE COUNTY,
LIST THE INFORMATION FOR YOUR ACTIVITIES IN EACH COUNTY SEPARATELY.**

2. Please report your TRAPPING and SNARING activities by county in the appropriate boxes below.

Species	County(s)	# of Traps/ Snare	# of Days	# Harvested
<i>Example:</i>				
Beaver				
Otter				
Muskrat				
Mink				
Marten				
Fisher				
Wolverine				
Lynx				

Species	County(s)	# of Traps/ Snare	# of Days	# Harvested
Bobcat				
Weasel				
Skunk				
Coyote				
Fox				
Raccoon				
Badger				
Other				

3. Please complete the following for predator and furbearer HUNTING activities WITHOUT HOUNDS.

List Species Hunted	County(s) Hunted	Days Hunted	Number Harvested

4. Please complete the following for predator and furbearer HUNTING activities WITH HOUNDS.

List Species Hunted	County(s) Hunted	Days Hunted	Number Harvested

Appendix G. Statewide harvest statistics illustrating trapper effort and calculated catch rates as variables for developing species population trend indices.

MONTANA DEPARTMENT OF FISH, WILDLIFE & PARKS

1993-1994 TRAPPING AND FUR HARVEST REPORT

STATE													
SPECIES AND COUNTY	TRAPPERS	TRAPPING ACTIVITY		TR DAYS / CATCH	HUNTING ACTIVITY		HOUNDSMAN ACTIVITY		ALL ACTIVITIES				
		TRAP DAYS	CATCH		HUNTERS	HUNTER DAYS	HUNTERS	HUNTER DAYS	TRAP OR HUNTERS	TOTAL HARVEST	MEAN SPECIES HARVEST % COMP.		
SPECIES: BEAVER													
SPEC. TOTAL	602	48919	9771	5.0	0	0	0	0	0	602	9771	16.2	18.9
SPECIES: MUSKRAT													
SPEC. TOTAL	346	44334	15772	2.8	0	0	0	0	0	346	15772	45.6	30.6
SPECIES: MINK													
SPEC. TOTAL	223	25113	844	29.8	0	0	0	0	0	223	844	3.8	1.6
SPECIES: MARTEN													
SPEC. TOTAL	133	28889	1013	28.5	0	0	0	0	0	133	1013	7.6	2.0
SPECIES: FISHER													
SPEC. TOTAL	8	376	5	69.0	0	0	0	0	0	8	5	0.7	0.0
SPECIES: WOLVERINE													
SPEC. TOTAL	27	711	11	65.2	0	0	0	0	0	27	11	0.4	0.0
SPECIES: BOBCAT													
SPEC. TOTAL	346	53071	670	79.2	76	1127	112	193	2434	577	975	1.7	1.9
SPECIES: LYNX													
SPEC. TOTAL	14	272	3	100.0	3	11	3	0	0	14	5	0.4	0.0
SPECIES: OTTER													
SPEC. TOTAL	68	2050	57	35.9	0	0	0	0	0	68	57	0.8	0.1
SPECIES: WEASEL													
SPEC. TOTAL	71	4313	327	13.2	0	0	0	0	0	71	327	4.6	0.6
SPECIES: SKUNK													
SPEC. TOTAL	163	52224	1734	30.1	0	0	0	0	0	163	1734	10.6	3.4
SPECIES: BADGER													
SPEC. TOTAL	161	50585	828	61.1	5	14	11	0	0	166	839	5.0	1.6

MONTANA DEPARTMENT OF FISH, WILDLIFE & PARKS

1993-1994 TRAPPING AND FUR HARVEST REPORT

STATE

SPECIES AND COUNTY	TRAPPERS	TRAPPING ACTIVITY		HUNTING ACTIVITY		HOUNDSMAN ACTIVITY		ALL ACTIVITIES						
		TRAP DAYS	CATCH	TR DAYS / CATCH	HUNTERS	HUNTER DAYS	HUNTERS	TRAP OR HUNTERS	TOTAL HARVEST	MEAN SPECIES HARVEST % COMP.				
SPECIES: RACCOON														
SPEC. TOTAL	316	53495	3215	16.6	27	185	226	38	942	626	368	4067	11.1	7.9
SPECIES: FOX														
SPEC. TOTAL	327	113813	5568	20.4	79	1653	463	3	19	16	368	6047	16.5	11.7
SPECIES: COYOTE														
SPEC. TOTAL	444	152351	7939	19.2	250	6335	1827	0	0	0	572	9766	17.1	18.9
SPECIES: OTHER														
SPEC. TOTAL	5	0	267	0.0	19	463	14	0	0	0	25	280	11.4	0.5
SPECIES: UNKNOWN														
SPEC. TOTAL	0	0	0	0.0	14	199	52	52	577	49	65	101	1.5	0.2
SPECIES: ALL SPECIES														
SPEC. TOTAL	967	630514	48023	13.1	329	9986	2706	381	3972	885	1220	51614	42.3	100.0

FINAL REPORT

Exposure to and injury from environmental
metal contamination on semi-aquatic mammals
in the upper Clark Fork River, Montana.

Research Report on Injury Determination
Wildlife Protocols #4 and #5
Assessment Plan, Part II
Clark Fork River Basin NPL Sites, Montana

Submitted by:

Harold L. Bergman

and

Michael J. Szumski

Red Buttes Environmental Biology Laboratory

University of Wyoming

Laramie, Wyoming 82071

and

David J. Dziak

Montana Department of Fish Wildlife and Parks

July, 1993

Coffin, K. W. 1994. Population characteristics and winter habitat selection by pine marten in southwest Montana. M.S. Thesis. Montana State University, Bozeman, MT 94p.

ABSTRACT

The Montana Department of Fish, Wildlife, and Parks and the U.S. Forest Service lacked site specific ecological data on which to base management decisions concerning pine marten in southwest Montana. This study, conducted during 1991 and 1992, was the last of 3 studies which began in 1989 to document population characteristics and habitat selection of pine marten in two areas of southwest Montana. Age and sex data from fur trappers catches was obtained to determine the effects of harvest on marten populations. Marten were radiocollared during the fall of 1991, and located using radio telemetry during the winter of 1991-1992. Marten locations were compared to random points to determine habitat selection. Habitat variables were divided into large, medium, and small scale categories. Small mammal trapping was conducted to determine the influence of small mammals in habitat selection of pine marten. Rest site structure was also noted. Juvenile marten outnumbered female marten 3:1 in harvested samples from Mosquito Gulch and Beaver/Tepee Creeks. Trappers regarded the 1991-1992 season as good, with catches being higher than the previous two years. Habitat use at the largest scale, involved all forested cover types but marten showed preference for mesic subalpine fir and lodgepole pine on the Big Hole study area. Sites with old growth characteristics were used less than expected on the Big Hole study area, but were sought out by marten on the Flats study area. On a medium scale, marten preferred areas with a higher basal area than that found at random points. At the smallest scale, marten locations were characterized by higher numbers of live trees and by a higher percent grass cover when compared to random points. Small mammal captures were not evenly distributed across habitats on the Big Hole or Flats study areas. Marten selected sites that were characterized by high densities of rodents. Marten utilized downed woody material in both areas for resting, but most rest episodes occurred in the tree canopy in red squirrel grass nests. Although pine marten in this study selected traits associated with mature forests they were found to be flexible with regard to habitat use on forested sites.

Heinemeyer, K. S. 1993. Temporal dynamics in the movements, habitat use, activity and spacing of reintroduced fishers in northwestern Montana. M.S. Thesis. University of Montana, Missoula, MT 158 p.

In the final 2 years of a 4 year project to reintroduce fishers (Martes pennanti) to the Cabinet Mountains of Montana, I translocated 78 fishers (1.0:1.3 M:F; 33 were juveniles) from Wisconsin in 1990 – 1991. Radiotags were placed on 25 animals in October 1990 to allow monitoring of movements, activity, habitat use, and fates through August 1991. Six animals were implanted with intraperitoneal transmitters, and 19 animals were radio-collared. Half the radiotagged animals were soft-released, with the remaining hard-released. Ground triangulation, aerial locations, and 24-hour remote monitoring revealed activity, movements, habitat use, and homerange establishment. Seasonal and permanent homerange and core activity areas (90% and 50% utilization volumes, respectively) were calculated with adaptive kernel analysis. Habitat selection, based on planimetric and hydrographic variables, was estimated using a nonmapping technique on a Geographic Information System.

During the 2-week post-releases period, soft- and hard-released fishers did not differ in movement rates ($p = 0.10$), activity levels ($p=0.89$), or mortality rates. Twenty-four fishers remained in the general release area, while 6 dispersed 9.4 – 18.0 km. Of the total mortalities ($n=14$), seven were from predation within the first 2 months of release. Most animals stabilized through winter; 9 females and 5 males maintained winter homeranges. Habitat selection during the winter was minimal: high activity levels, low movement rates, and a shift to nocturnal activity may indicate that harsh environmental conditions limited movements of the fishers. During the breeding season, fishers increased movement rates, and used low elevation habitats close to water, with flat or shallow slopes. Adult males increased movement rates, and the single adult male homerange increased from 3.6 to 99.3 km². Some females shifted core activity areas, resulting in overlap with the adult male and with each other. Juvenile males did not appear to respond to breeding season. After breeding season, females again shifted core areas to re-establish intrasexually exclusive areas. Nine animals (2 males and 7 females, including 2 from a prior release) established permanent homeranges. The fishers settled in low elevation, mesic habitats, in proximity to 2 prior residents; these prior residents may have served as indicators of habitat quality.

Montana females maintained small homeranges compared to standardized estimates for Idaho animals, possibly due to varying habitat quality or intrasexual competition; alternatively, this may be related to the colonization process. Although mortality removed 14 of the 25 animals from the population, higher settlement rates were seen in this study as compared to the first 2 years of translocations (Roy 1991). This is discussed in light of settlement and colonization processes, and implications for future reintroductions. The reintroduction process is examined at several scales, from animal husbandry to metapopulation dynamics.

Kujala, Q. J. 1993. Winter habitat selection and habitat status of pine marten in southwest Montana. M.S. Thesis. Montana State University, Bozeman, MT 58 p.

ABSTRACT

The pine marten (Martes americana) has been considered as an indicator species for old growth forests. A study of marten habitat use in southwest Montana in 1991-92 indicated that marten utilized old growth timber but also utilized younger but mature stands of native conifers. Mesic conditions, size of deadfall, well-developed canopy covers associated with mature trees, and pine marten prey were important habitat variables influencing pine marten use of an area. Fur trapper returns and comments suggested that pine marten populations on the study areas were at relatively low numbers during the study. Trappers responded to these low marten numbers by decreasing trapping effort at the Big Hole site but not at West Yellowstone. Untrapped areas adjacent to study sites evidently served as reservoirs for restocking trapped areas. Most of the marten on the trapped study sites were live-trapped and/or harvested, but immigration continued throughout the study, evidently from reservoir areas.

